

1. A method for preventing duplicate matching entries in a translation lookaside buffer (TLB), the method comprising:

receiving a request to write an entry of the TLB,

wherein the write request includes a tag;

determining which entries of the TLB have a tag

matching the write request tag; and

clearing an indicator in each entry of the TLB entries

having a tag matching the write request tag.

2. The method of claim 1, further comprising:

determining whether the write request is valid;

determining whether any of the matching TLB entries

other than the entry specified by the write

request is valid;

excluding each matching TLB entry whose indicator is

clear; and

generating an exception, if the write request is valid and one or more of the non-excluded matching TLB entries other than the entry specified by the write request is valid.

3. The method of claim 2, wherein the exception indicates the write request is attempting to write a duplicate matching entry in the TLB.
4. The method of claim 2, wherein said generating the exception is performed only if the write request is valid and one or more of the non-excluded matching TLB entries other than the entry specified by the write request is valid.
5. The method of claim 2, wherein said generating the exception is not performed if the write request is invalid.
6. The method of claim 2, wherein said generating the exception is not performed if each of the non-excluded matching TLB entries other than the entry specified by the write request is invalid.

7. The method of claim 2, wherein said determining whether the write request is valid comprises determining whether a valid bit included in the write request is true.
8. The method of claim 7, wherein the valid bit is user-programmable.
9. The method of claim 2, wherein said determining whether any of the matching TLB entries other than the entry specified by the write request is valid comprises determining whether a valid bit included in the matching TLB entries other than the entry specified by the write request is true.
10. The method of claim 9, wherein the valid bit is user-programmable.
11. The method of claim 2, wherein the exception comprises a machine check exception.

12. The method of claim 2, further comprising:

aborting the write operation, if the write request is valid and one or more of the non-excluded matching TLB entries other than the entry specified by the write request is valid.

13. The method of claim 2, further comprising:

disabling operation of the TLB, if the write request is valid and one or more of the non-excluded matching TLB entries other than the entry specified by the write request is valid.

14. The method of claim 1, further comprising:

writing the TLB entry specified by the write request, if the write request is invalid.

15. The method of claim 1, further comprising:

setting the indicator in the TLB entry specified by the write request, if the write request is invalid.

16. The method of claim 1, further comprising:

writing the entry specified by the write request, if each of the non-excluded matching TLB entries other than the entry specified by the write request is invalid.

17. The method of claim 1, further comprising:

setting the indicator in the entry specified by the write request, if each of the non-excluded matching TLB entries other than the entry specified by the write request is invalid.

18. The method of claim 1, further comprising:

receiving a request to lookup an entry in the TLB having a tag matching a tag specified by the lookup request, after said clearing the indicator in each entry of the TLB having a tag that matches the write request tag; and

excluding from the lookup each entry in the TLB having its indicator cleared.

19. The method of claim 18, further comprising:

including in the lookup each entry in the TLB having
the indicator set.

20. The method of claim 1, wherein the tag comprises a
virtual page address.

21. The method of claim 20, wherein the tag comprises an
address space identifier.

22. The method of claim 21, wherein the tag comprises a
control value for selectively specifying exclusion of
the address space identifier in said determining which
entries of the TLB have a tag matching the write
request tag.

23. The method of claim 20, wherein the tag comprises a
mask field for specifying a portion of the virtual
page address to exclude in said determining which
entries of the TLB have a tag matching the write
request tag.

24. The method of claim 1, further comprising:

receiving a request to reset the TLB; and

clearing the indicator in each entry of the TLB, in
response to said receiving the reset request.

25. The method of claim 1, wherein the request to write
the TLB comprises an instruction executed by a
microprocessor comprising the TLB.

26. The method of claim 25, wherein the instruction
instructs the microprocessor to select the TLB entry
specified by the write request at random.

27. A method for preventing duplicate matching entries in a translation lookaside buffer (TLB), the method comprising:
- receiving a request to lookup a tag in the TLB; and
- excluding from the lookup each entry of the TLB having an indicator with a cleared value.
28. The method of claim 27, wherein for each TLB entry the indicator is cleared when a write request is received by the TLB that has a tag matching the TLB entry tag.
29. The method of claim 28, wherein for each TLB entry the indicator is set if the TLB entry is actually written in response to the write request.
30. The method of claim 29, wherein the TLB aborts the write request if the write request is valid and one or more entries of the TLB having its indicator set and having a tag matching the write request tag, other than the TLB entry specified by the write request, is valid.

31. The method of claim 29, wherein the TLB generates an exception if the write request is valid and one or more entries of the TLB having its indicator set and having a tag matching the write request tag, other than the TLB entry specified by the write request, is valid.
32. The method of claim 27, wherein said indicator is not user-accessible.

33. An apparatus for preventing duplicate matching entries in a translation lookaside buffer (TLB), the apparatus comprising:

a plurality of indicators, associated with a corresponding plurality of entries of the TLB, each for specifying whether to include said corresponding entry in a tag comparison operation; and

logic, coupled to said plurality of indicators, for clearing said corresponding indicator to a first predetermined value if said corresponding entry has a tag that matches a tag specified in a request to write one of said plurality of TLB entries.

34. The apparatus of claim 33, wherein said first predetermined value indicates said corresponding TLB entry is not to be included in said tag comparison operation.

35. The apparatus of claim 34, wherein said logic is further configured to set said corresponding indicator to a second predetermined value if the TLB actually writes to said corresponding TLB entry in response to said write request.
36. The apparatus of claim 35, wherein said second predetermined value indicates said corresponding TLB entry is to be included in said tag comparison operation.
37. The apparatus of claim 33, wherein said corresponding TLB entry tag comprises a virtual page address.
38. The apparatus of claim 37, wherein said tag comparison operation comprises comparing said virtual page address in said corresponding TLB entry with a virtual page address in said write request tag to determine whether said virtual addresses match.
39. The apparatus of claim 37, wherein said tag comparison operation comprises comparing said virtual page address in said corresponding TLB entry with a virtual page address in a lookup request tag to determine whether said virtual addresses match.

40. The apparatus of claim 33, further comprising:

an exception output, coupled to said plurality of indicators, for indicating a condition in which said write request is attempting to write a duplicate matching tag into said plurality of TLB entries.

41. The apparatus of claim 40, wherein the apparatus generates a true value on said exception output only if said write request is valid and at least one of said plurality of TLB entries other than said one of said plurality of TLB entries specified by said write request is valid, has its tag matching said tag of said write request, and does not have its indicator set to said first predetermined value.

42. The apparatus of claim 33, wherein the TLB actually writes said write request into said one of said plurality of TLB entries specified by said write request if said write request is invalid.

43. The apparatus of claim 33, wherein the TLB actually writes said write request into said one of said plurality of TLB entries specified by said write request if none of said plurality of TLB entries other than said one of said plurality of TLB entries specified by said write request is valid.
44. The apparatus of claim 33, wherein the TLB actually writes said write request into said one of said plurality of TLB entries specified by said write request if none of said plurality of TLB entries other than said one of said plurality of TLB entries specified by said write request has its tag matching said tag of said write request.
45. The apparatus of claim 33, wherein the TLB actually writes said write request into said one of said plurality of TLB entries specified by said write request if none of said plurality of TLB entries other than said one of said plurality of TLB entries specified by said write request has its indicator set to said first predetermined value.

46. The apparatus of claim 33, wherein each of said plurality of TLB entries comprises a physical page address mapped from said tag.
47. The apparatus of claim 46, wherein said tag of each of said plurality of TLB entries comprises a virtual page address, wherein said physical page address is mapped from said virtual page address.
48. The apparatus of claim 33, wherein said plurality of indicators are not software-visible.
49. The apparatus of claim 33, wherein a computer program product comprising a computer usable medium having computer readable program code causes the apparatus, wherein said computer program product is for use with a computing device.
50. The apparatus of claim 33, wherein a computer data signal embodied in a transmission medium comprising computer-readable program code provides the apparatus.

51. A computer program product for use with a computing device, the computer program product comprising:

a computer usable medium, having computer readable program code embodied in said medium, for causing an apparatus for preventing duplicate matching entries in a translation lookaside buffer (TLB), said computer readable program code comprising:

first program code for providing a plurality of indicators, associated with a corresponding plurality of entries of the TLB, each for specifying whether to include said corresponding entry in a tag comparison operation; and

second program code for providing logic, coupled to said plurality of indicators, for clearing said corresponding indicator to a first predetermined value if said corresponding entry has a tag that matches a tag specified in a request to write one of said plurality of TLB entries.

52. A computer data signal embodied in a transmission medium, comprising:

computer-readable program code for providing an apparatus for preventing duplicate matching entries in a translation lookaside buffer (TLB), said program code comprising:

first program code for providing a plurality of indicators, associated with a corresponding plurality of entries of the TLB, each for specifying whether to include said corresponding entry in a tag comparison operation; and

second program code for providing logic, coupled to said plurality of indicators, for clearing said corresponding indicator to a first predetermined value if said corresponding entry has a tag that matches a tag specified in a request to write one of said plurality of TLB entries.

53. A processing system, comprising:

a memory, for storing program instructions; and

a microprocessor, coupled to said memory, for executing said program instructions, said microprocessor comprising an apparatus for preventing duplicate matching entries in a translation lookaside buffer (TLB) of said microprocessor, the apparatus comprising:

a plurality of indicators, associated with a corresponding plurality of entries of the TLB, each for specifying whether to include said corresponding entry in a tag comparison operation; and

logic, coupled to said plurality of indicators, for clearing said corresponding indicator to a first predetermined value if said corresponding entry has a tag that matches a tag specified in a request to write one of said plurality of TLB entries.

54. The processing system of claim 53, wherein said first predetermined value indicates said corresponding TLB entry is not to be included in said tag comparison operation.

55. The processing system of claim 53, further comprising:

at least one input/output (I/O) device, coupled to said microprocessor, configured to receive input data for provision to said microprocessor for processing, and to output results of said processing received from said microprocessor.